

National Aeronautics and  
Space Administration

# LAGNIAPPE

[www.ssc.nasa.gov](http://www.ssc.nasa.gov)

Volume 24 Issue 12

John C. Stennis Space Center

December 14, 2001

*Peace on Earth*





## NASA lends remote sensing expertise to FEMA, New York City after Sept. 11 events

NASA's Stennis Space Center recently sent remote sensing scientist Dr. Bruce Davis, acting chief of the applications research division of the Earth Science Applications Directorate (ESAD) at Stennis, to New York, where he spent 10 days heading the Agency's effort to support the Federal Emergency Management Agency (FEMA) following the events of Sept. 11.

NASA Headquarters asked Davis to act as a technical consultant to its Northeast Regional Applications Center in Auburn, N.Y., in providing visualizations of the disaster for the governor's office. Shortly after his arrival, Davis was requested in New York City to provide remote sensing technical assistance to FEMA.

"FEMA asked NASA to provide technical assistance in the use of remote sensing technology to help response teams working at New York's World Trade Center and to determine who potential government and commercial providers might be," Davis said.

"Our Stennis program's strongest asset was our ability to communicate with the disaster response community, determine their information product requirements and translate those requirements into technical specifications that can be met by commer-



**NASA's Stennis Space Center remote sensing scientist Dr. Bruce Davis.**

cial or other government agency providers. And, where information products were not available, we actually developed a team here at Stennis to create information tailored to the Sept. 11 disaster."

Some of the questions Davis and his team were able to answer for FEMA included:

- Would oblique photography help? How could we use it near real time to locate buried structures like stairwells, or estimate the volume of the debris pile?
- Why does the Light Detection and Ranging (LIDAR) data collected have so many anomalies, and what causes them?
- Can we get high-resolution images that penetrate the smoke?
- Are there remote sensing technologies that can detect underground voids?
- How can we get accurate, near real-time

See FEMA, Page 8



Mississippi Gov. Ronnie Musgrove, center, toured Stennis Space Center and new construction at the Lockheed Martin Space Operations' Propulsion, Thermal and Metrology Center as part of the state's 'Capital for a Day' program. Pictured from left, NASA's William Parsons, director, Center Operations and Support Directorate; State Rep. Dirk Dedeaux; Musgrove; Jack Divers, director, LMSO's Metrology Center; and, accompanying the governor, Sgt. C.E. Patterson.

## NEWSCLIPS

**Hubble makes first direct measurements of atmosphere on world around another star:** Astronomers using NASA's Hubble Space Telescope have made the first direct detection of the atmosphere of a planet orbiting a star outside our solar system and have obtained the first information about its chemical composition. Their unique observations demonstrate that it is possible, with telescopes, to measure the chemical makeup of a planet's atmosphere and to potentially search for chemical markers of life beyond Earth. The Hubble observation was not geared to look for gases; nevertheless, this unique observation technique opens a new phase in the exploration of extra-solar planets, say astronomers at Goddard Space Flight Center, Greenbelt, Md.

**Good vibrations may prevent bone loss in space:** New NASA research suggests bones that are slightly shaken may help astronauts stay healthier during long spaceflights and could be used to help people suffering from bone loss here on Earth. Scientists funded by NASA and its National Space Biomedical Research Institute in Houston uncovered evidence that barely perceptible vibrations may stimulate bone growth, which would benefit astronauts on extended space missions, the elderly here on the ground and other people immobilized by paralysis or bed rest.

**SOHO's latest surprise — gases near the Sun are heading the wrong way:** Mysterious clouds of gas falling toward the Sun have been spotted with the Solar and Heliospheric Observatory (SOHO) spacecraft, a project of international cooperation between the European Space Agency and NASA. They go against the fast-moving streams of gas that pour continuously into space in the solar wind. Scientists who found them suggest that the inflows are because of frequent local adjustments to the Sun's magnetic field. The discovery promises a better understanding of the sources of the solar magnetism that envelopes the Earth.



## NASA celebrates record year for Space Shuttle launches



The Dec. 5 launch of the Space Shuttle Endeavour completed a record-breaking year of missions that finished the first phase of the International Space Station's orbital assembly. In the past 12 months, NASA has completed some of the most challenging space flights in history. Traveling to the station aboard Endeavour to begin a five-month stay were Expedition Four Commander Yuri Onufrienko and flight engineers Carl Walz and Dan Bursch. Coming home on Endeavour after almost four months on the station will be Expedition Three Commander Frank Culbertson, Pilot Vladimir Dezhurov and Flight Engineer Mikhail Tyurin. Endeavour is commanded by Dom Gorie and piloted by Mark Kelly. Mission specialists are Linda Godwin and Daniel Tani.

## New E-Complex facility on-line to support propulsion programs

Following two years of development, Stennis marked the opening of a new Data Acquisition and Control System (DACS) Development Laboratory with an open house Nov. 9. The lab, located in Building 4010 in the E-Complex, is part of the Propulsion Test Directorate's \$24 million upgrade program to modernize rocket propulsion testing efforts.

"The advantage the new DACS Lab offers, is that engineers can utilize the same hardware and software as the actual E-Complex test facilities, providing the capability to simulate actions of the testing environment," NASA's Engineering Electrical Design Lead, Randy Holland, said. "The lab provides the ability to safely develop rocket propulsion Data Acquisition and Control Systems; evaluate technology/process improvements; and create a realistic environment for training new personnel, all without operational interference."

Stennis' Propulsion Test Directorate Engineering Division with support from LMSO's Terrence Burrell, Scott Spooner, and Herb Lane, accomplished the build-up and use of the lab in Building 8306, while construct was being completed in Building 4010.

In addition to supporting on-going propulsion projects, Holland said, the Lab is also being used in the implementation of a near real-time remote data communication software (PCGoal) for the entire E-Test Complex and in evaluating several possibilities for enhancing control system operational performance.

With the DACS Lab facility development and activation



The E-Complex opened the doors to the newly developed Data Acquisition and Control System (DACS) Development Laboratory with an open house Nov. 9. NASA's Randy Holland, DACS Lab project lead, center, works with Tran Duong, E-3 test facility controls specialist, left, and Lonnie Duetrix, E-1 test facility control specialist, right, to demonstrate some of the lab's capabilities.

milestones complete, the lab is proving to be a valuable resource in the pursuit of test technology modernization and efficient, safe and reliable test system DACS developments.



# 2001: Stennis celebrates

For Stennis and NASA, 2001 was a year of achievements and notable changes. Stennis celebrated its 40th anniversary in October, and NASA celebrated the first full year of human habitation of the International Space Station.

In March, Mark Craig, former Stennis Space Center deputy director, was named acting director when Roy Estess was appointed to serve as the acting director at Johnson Space Center in Houston. Craig took charge of the daily operations of the space center, which employs more than 4,500. In fiscal year 2000, Stennis had an economic impact of \$438 million in the area within a 50-mile radius. That figure is up from \$405 million the previous year. The center had a direct global economic impact of \$615 million.

After nearly 10 years as the head of America's space program, NASA's ninth and longest-serving administrator, Daniel Goldin, stepped down Nov. 17. President George W. Bush nominated former Office of Management and Budget Deputy Director Sean O'Keefe as his replacement.

## New Business

Stennis continued to see results from ambitious efforts over the past two years to position the center as a viable location for a multitude of commercial and government agencies.

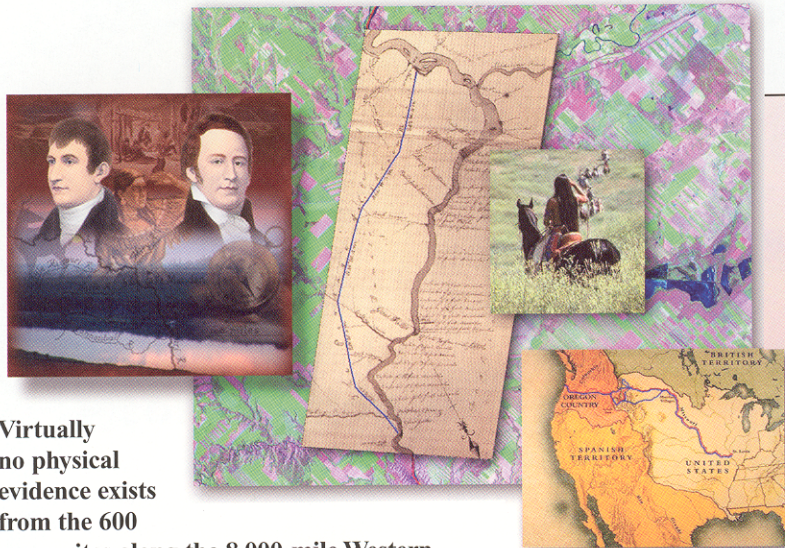
In January, U.S. Sen. Trent Lott announced that the U.S. Department of Defense's Ballistic Missile Defense Organization selected Stennis as the location of the Space-Based Laser Performance Test Facility.

The Commander, Naval Meteorology and Oceanography Command moved into new headquarters in Building 1100 in March. Groundbreaking ceremonies for a new annex to house the Navy Oceanographic Warfighting Support Center and the Survey Operations Center took place in June.

Hancock Bank, a fixture at Stennis since 1963, broke ground in March for a new drive-through facility, which was dubbed the Hancock Bank "Satellite" Branch when it opened in November.

## Propulsion

In January, the 2001 calendar for propulsion activities was already tightly scheduled. With the arrival of the RS-68 Common Booster Core (CBC), the Boeing Company's RS-68 program was ready to begin a new series of tests aimed at proving flight readiness. The CBC concluded a successful series of tests in June.



**Virtually no physical evidence exists from the 600 camp sites along the 8,000-mile Western expedition of explorers Lewis and Clark, pictured above. But NASA's remote-sensing applications may offer some clues. The satellite image pictured above shows the Missouri River flowing through the Great Falls, Mont., area. The highlighted area is an image overlaid onto the modern landscape, which might provide clues about the explorers' camp sites. A line highlighted on the map of what was the United States and Spanish Territory in the early 1800s shows the complete Lewis and Clark route.**

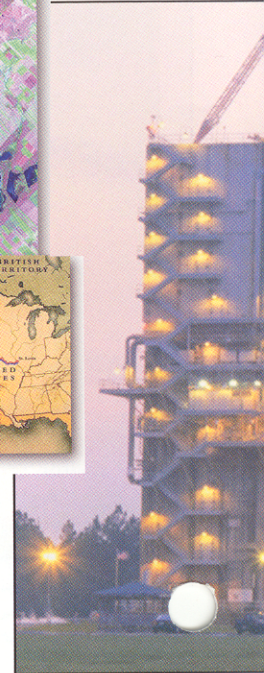


**NASA's Environmental Officer at Stennis Space Center, Ron Magee, center, briefed media in April on the initial phase of an environmental remediation operation in an area that included the Air Force Disposal site where herbicide-contaminated materials were buried in the 1970s.**

In February, Stennis reached a milestone with the successful acceptance testing of the Pratt and Whitney high-pressure fuel turbopump. The turbopump is the centerpiece of the Space Shuttle Main Engine Block II configura-

tion that provides astronauts an even safer ride to orbit.

Qualification testing on X-33 dual flight engines was under way when, in March, both the X-33 and X-34 programs were cancelled.



**Stennis Space Center completed a three-part test series of the Linear Aerospike Actuator technology used in the program's Linear Aerospike engine. The series was conducted at NASA's Space Launch**





# es year of achievements



ducted the final test of a  
e Electro-Mechanical  
on the former X-33  
like XRS-2200 flight  
ducted as part of  
initiative.



In October, NASA Administrator Daniel Goldin announced the 'Flags for Heroes and Families' campaign. On Dec. 5, the Space Shuttle Endeavour carried thousands of American flags into space. The flags will be distributed to the victims' families and survivors of the events of Sept. 11. During the announcement, made in New York City (NYC), Goldin, right, presented Mayor Rudolph Giuliani with an American flag carried into space on a previous Space Shuttle flight. Pictured from left, Giuliani, NYC Fire Commissioner Thomas Von Essen and Goldin.



NASA's Office of Education at Stennis continued its contributions to schools in the surrounding communities. Educator Resource Center Coordinator Randall Hicks assists junior high students at the Piney Woods School in Jackson during a robotics workshop. Students participating in the workshop learned the fundamentals of robotics, including programming, sensors and actuators.



NASA's Bruce Spiering demonstrates the portable video imager during a technology commercialization seminar. Spiering and NASA's Dr. Greg Carter initially designed the imager for early detection of chlorophyll loss. The technology, with a modified prototype of the imager, underwent initial flight testing in May to evaluate the imager's use in detection of raw sewage leaking into the environment near Mobile Bay, Ala.

generation propulsion systems.

The year held a number of milestone achievements for the E-Complex, including the successful completion of the first phase in an important test series for the Integrated Powerhead Demonstrator (IPD) Liquid Oxygen Turbopump in November. The IPD program is developing new technologies for NASA's second-generation propulsion systems. Further work continued in the Hydrogen Peroxide area with numerous successful catalyst bed and advanced development tests in support of the second generation upper stage arena. Testing was also completed on a Hybrid Sounding Rocket concept developed by Lockheed Martin.

In May, the E-Complex began work on nearly \$24 million worth of upgrades to improve the center's ability to meet customers' needs more efficiently.

Initial engineering and design efforts for the E-4 facility were begun during the year. The facility will perform sea-level static testing of the Rocket Based Combined Cycle engine.

See YEAR END, Page 7

Not to lose the advantage of the Linear Aerospike XRS-2200 flight engine set already installed on the test stand, NASA's Space Launch Initiative Program Office at Marshall Space Flight Center in Huntsville, Ala., pro-

ceeded with testing of the Electro-Mechanical Actuator (EMA) technology on the engine in August. The aerospace industry is proposing EMA technology as a replacement to standard hydraulic-fluid systems for use in all second-





**Space Shuttle Main Engine (SSME) Project Manager George Hobson of Marshall Space Flight Center, Huntsville, Ala., was on site Nov. 20 to thank Stennis employees for their support in the certification of the SSME Block II engine configuration. Pictured from left, Hobson, NASA's Keith Brock, Mississippi Space Services' Brian Corr, Wayne Byrd and Merle Jopes.**

## NASA awards SBIR Phase II contracts

Stennis Space Center is working with five firms that are among 126 whose research proposals were recently selected by NASA for negotiation of Phase II contract awards for NASA's Small Business Innovation Research (SBIR) Program. The 126 projects, which have a total value of approximately \$75 million, will be conducted by 105 small, high-technology firms located in 28 states.

The goals of this NASA program are to stimulate technological innovation, increase the use of small businesses — including women-owned and disadvantaged firms — in meeting federal research and development needs and increase private-sector commercialization of innovations derived from federally funded research.

Phase II continues development of the most promising Phase I projects. Selection criteria include technical merit and innovation, Phase I results, value to NASA, commercial potential and company capabilities. Funding for Phase II contracts could be up to \$600,000 for a two-year performance period.

The awardees working with Stennis are AI Signal Research Inc. of Huntsville, Ala.; AJT and Associates Inc. of Cape Canaveral, Fla.; Duncan Technologies Inc. of Auburn, Calif.; Physical Optics Corp. of Torrance, Calif.; and WET Labs of Philomath, Ore.

## Stennis sponsoring seven schools in the annual FIRST robotics competition

Stennis Space Center, a strong supporter of the annual For Inspiration and Recognition of Science and Technology (FIRST) Robotics competition, will support six Mississippi teams and one Louisiana team in this year's competition.

The FIRST program, founded by world-renowned scientist and inventor Dean Kamen, is meant to inspire students to explore science and technology fields. NASA, which sponsored more FIRST teams in the 2001 competition than any other business or organization, will assist this year's teams in building their robots for the 2002 event.

Teams receiving support from Stennis this year are Choctaw Central High School in Philadelphia; Piney Woods School and Provine High School, both located in

Jackson; Picayune High School in Picayune; Warren Central High School in Vicksburg; Gulfport High School in Gulfport; and Pearl River High School in Pearl River, La.

Stennis offers grants to qualifying teams for their first two years of competition and then provides mentorship and advice. When teams are designing and constructing their robots, students work side-by-side with Stennis scientists and engineers.

"FIRST is a valuable tool for students, teaching them not only science and engineering, but also teamwork and problem-solving skills," Wanda DeMaggio, pre-college/technology officer for the NASA Office of Education at Stennis, said. "NASA's Office of Education wants to introduce as

See **ROBOTICS**, Page 8

Officials celebrated the opening of the Hancock Bank Satellite Drive-through Branch Bank in October. On hand for ribbon cutting festivities were, from left, James Ginn, Hancock Bank Executive Vice President; Ed Hilliard, Senior Vice President - Western Division Manager; Stacey Spiers, Stennis Space Center Branch Manager; Stennis Space Center Acting Director Mark Craig; and the StenniSphere Inflatable Astronaut.







**StenniSphere, Stennis' award-winning visitor center, is once again welcoming students to enjoy interactive exhibits. The center had been closed for security reasons since Sept. 11.**

## YEAR END . . .

(Continued from Page 5)

### Earth Science Applications

Stennis Space Center sent a team of remote sensing scientists to New York to lead the Agency's effort to support the Federal Emergency Management Agency following the events of Sept. 11.

NASA and the U.S. Department of Agriculture in March released a request for proposals for projects to develop and deliver space-age information products to farmers through the AG 20/20 Initiative. The initiative is aimed at creating programs using NASA research and technology to develop tools farmers can use to more effectively manage production, save money and preserve the environment. The programs help farmers meet the challenges of skyrocketing production costs, low commodity prices and high-risk operations so they may better compete in world markets.

In September, researchers at Stennis signed a Space Act Agreement with noted archaeologist Ken Karsmizki to apply NASA remote sensing technology to the task of identifying and mapping sites along the trail of the Lewis and Clark expedition,

which explored uncharted territory west of the Mississippi River for the U.S. government nearly 200 years ago.

### Technology Transfer

The year was marked by significant achievements in the Dual Use partnership initiative. The Stennis Office of Technology Transfer focused on development of key, high priority technologies as expressed by the center's directorates. Using resources within the program, the office demonstrated a 90 percent success rate in development of these technologies, while fostering partnerships with companies that contributed funds to the development effort. In all, the 11 projects achieved a 50 percent contribution rate from the companies.

The office was instrumental in the development of a new optical sample cell system used in the analysis of water samples at sea by teaming a NASA biological oceanographer with a Florida-based international manufacturer of laboratory equipment. The effort resulted in a rugged instrumentation system capable of obtaining high sensitivity measurements across widely divergent sample types.

In June, the first commercial version of a NASA-developed hand-held plant stress monitor that uses "point-and-shoot" technology to detect early signs of plant stress hit the market. The product, marketed by Spectrum Technologies Inc. of Plainfield, Ill., was the result of an Office of Technology Transfer exclusive patent license from NASA.

In August, a NASA-developed portable remote imager that detects changes in plant chlorophyll levels not visible to the naked eye underwent its first test flight. The imager holds potential as a useful tool for agriculture, forestry, environmental health and industry.

### Education

NASA's Office of Education at Stennis continued its contributions to schools in the surrounding communities. In January, NASA donated 25 computers to a lab at the Piney Woods School near Jackson. The computers, which were once used by Stennis employees, make the technology-rich learning tool of remote sensing avail-

able to students and contribute invaluable to their learning experience.

The Stennis Educator Resource Center provided free quarterly workshops covering a vast range of topics for educators of K-12 grade levels.

NASA and the Office of Education were selected by CNNfyi.com and Turner Learning to sponsor a month-long "Learning Adventure" on the subject of space and NASA's Human Exploration and Development of Space Enterprise. The adventure, which took place in April, explained, among other things, how astronauts are selected and trained; how the Space Transportation System works; what's going on at the International Space Station; and the status of the exploration of Mars.

### Environment

In April, NASA and the U.S. Air Force began the initial phase of an environmental remediation operation to address soil and groundwater contamination at Stennis.

In June, Environmental Office, as part of a NASA team, was presented a 2001 White House Closing the Circle Award for its work in a national pilot program for the development of a NASA Environmental Management System. The system was used by Stennis as one of the first federal agencies to gain ISO 14001 certification in June.

### StenniSphere

In February, The Mississippi Tourism Association named StenniSphere Mississippi's Travel Attraction of the Year 2000.

Community and government leaders took part in a ribbon cutting ceremony in March, marking the opening of three new exhibits in the visitor center.

In May, StenniSphere recognized its 250,000th visitor and then opened its doors to more than 13,000 visitors for the first-ever public night test firing of a Space Shuttle Main Engine.

The Southern Public Relations Federation in July honored StenniSphere and its programs with seven Lantern Awards, including the Best of Show Award, for excellence in public relations work and promotion of StenniSphere.



**In a ribbon cutting ceremony Nov. 13, NASA's Office of Education at Stennis and University of Southern Mississippi (USM) officials marked the opening of a new master of business administration program offered by the Center for Higher Learning (CHL) at Stennis. From left, Dr. Donald Cotton, vice president, USM; Dr. Jim Meredith, director, CHL; NASA's Mark Craig, Stennis acting director; Dr. William Gunther, dean of business, USM; NASA's Dr. David Powe, manager, Office of Education; and Dr. Don Durham, technical director, Commander, Naval Oceanography and Meteorology Command.**



## Safety Corner

# 'Tis the season to watch for deer

Oh, Deer! Stennis Security records indicate at least 25 deer-vehicle crashes occur each year. The highest risk months are October through February, with another peak in the spring when young, tender vegetation is abundant.

Vigilance is the best way to avoid deer-vehicle crashes. In daylight hours, the watchful motorist can often see a deer at the side of the road, or on the road, soon enough to avoid a collision. In darkness or near-darkness, however, motorists frequently do not see an animal until it is too close to avoid.

Here are a few tips to follow in avoiding deer-vehicle crashes:

- If you see one deer on or near a roadway, expect that others may follow. Slow down and be alert.
- After dark, use high beams when there is no oncoming traffic. The high beams will provide better visibility and allow for greater reaction time. However, be advised that bright lights tend to immobilize deer. Honk your horn in an effort to get the deer to move off the road.
- Always wear a seat belt, as required by state law, and drive at a safe, sensible speed to prevent such collisions.
- Report any deer-vehicle collisions to Stennis Security, a local law enforcement agency or a state wildlife officer and your insurance agent/company within 24 hours. At Stennis, deer-vehicle collisions should be immediately reported to Security (911).

## QUICK LOOK

■ **The NASA Exchange will host the 2001 NASA Fall Barbecue** beginning at 4 p.m. Friday, Nov. 16, at the Cypress House Pavilion. Tickets are \$3 in advance and \$4 at the door. Children under 12 eat free with a ticket marked "child." The barbecue is open to NASA employees, retirees, their families and guests. For information contact Bo Clarke at Ext. 8-1645, or Jon Roth at Ext. 8-2123.

■ **Speakeasy Toastmasters at Stennis** welcomes anyone interested in improving his or her communication skills in a fun, supportive environment. The club meets the first and third Thursday of each month from 11:30 a.m. to 12:30 p.m. in the NASA conference center. For information, contact Leigh Schaumburg at Ext. 8-5165.

■ **The following will be closed Thursday, Nov. 22, in observance of Thanksgiving:** Keesler Federal Credit Union, Stennis Child Care Development Center, APG Service Station, Dave's Snack Bar, Main Cafeteria, U.S. Post Office, World Wide Travel, Hancock Bank, The Wellness Center, Corporate Cleaners, MSS-InDyne mail services and taxi service, the barber shop and communications. The Stennis Child Care Development Center will remain closed Friday, Nov. 23.

## MAPPING . . .

(Continued from Page 1)

for Earth Science at NASA Headquarters in Washington, D.C.

"North Carolina was already one of the most sophisticated states in the U.S. in the use of geographic information," said Dr. Bruce Davis, a geographer and acting chief of the application research division of NASA's Earth Science Applications Directorate at Stennis. "The state, through its Center for Geographic Information and Analysis, was well prepared to take advantage of remote sensing data.

"We assisted in the review of North Carolina's quality control plan for the development of digital elevation-model products. We also engaged in pilot projects that gave the state an initial look at the quality and utility of remotely sensed data to be used for the development of improved digital elevation models."

"With this statewide digital elevation model, we are looking at informed methods of assessing the impact to be felt by communities as they grow and develop," John Dorman, North Carolina administrator for survey and mapping, said. "The accuracy of the elevation data will greatly assist in mapping areas that might potentially become flooded in the future."

North Carolina officials believe the work with NASA holds great promise for future development and mapping of potential flood zones. The research data collected by the Stennis team could be used to model almost any coastal region or other areas prone to flooding.

## LAGNIAPPE

*Lagniappe* is published monthly by the John C. Stennis Space Center, National Aeronautics and Space Administration. Mark Craig is the acting director, Myron Webb is the public affairs officer, and Lane Cooksey is the news chief. Comments and suggestions should be forwarded to the Lagniappe Office, Building 1200, Room 208D, Stennis Space Center, MS 39529, or call (228) 688-3585.

EDITOR: . . . . . B. R. Hawkins

CONTRIBUTING WRITERS:

Karen Bryant . . . . . Judy Isbell  
Tom Powers

CONTRIBUTING PHOTOGRAPHER:

Charles E. Jones



National Aeronautics and  
Space Administration

**John C. Stennis Space Center**  
Stennis Space Center, MS 39529

Official Business

Penalty for Private Use \$300

**PRESRT STD**  
**U.S. POSTAGE PAID**  
**Permit No. G-27**